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The Diagnosis and Management of Small Renal Masses

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The Diagnosis and Management of Small Renal Masses

Small renal masses (SRMs) comprise an important part of most urologist's workload. This special issue contains a series of evidenced-based papers written by leading experts in the field, covering all aspects of diagnosis and management of SRMs.

A small renal mass is defined as one less than 4cm in size[1]. The incidence of SRMs has increased notably in the past few decades mainly related to the increased incidence of incidental masses identified following ultrasound or CT/MRI scans of the abdomen for unrelated reasons[1-3]. Renal cell carcinoma (RCC) is the most common type of tumour, accounting for 90% of all malignant kidney masses. RCC accounts for around 2-3% of all newly diagnosed cancers [4, 5].

Initially Elstob and colleagues detail how to assess the key features of small renal masses on imaging including how to assess whether it is benign or malignant, whether it shows signs of biological aggressiveness as well as the anatomical information that helps guide interventional and surgical management [2]. Contrast-enhanced CT has high diagnostic accuracy for the diagnosis of renal cell carcinoma and is the diagnostic modality of choice. Contrast-enhanced ultrasound and MRI are good techniques for indeterminate lesions or in patients who cannot have a CT scan. The key pre-and post-operative variables that determine prognosis for RCC are detailed in the special series paper by Crestani et al[1].

Alongside the increased incidence of incidental SRMs there has been a stage and grade migration towards less advanced and less aggressive tumours at presentation. This has paved the way for a need to better characterise these lesions in order to make the most appropriate management decisions and reduce unnecessary harm to patients. Given that the majority of SRMs are benign tumours or RCCs with an indolent behaviour, renal biopsy plays an increasingly important role in differentiating malignant from benign tumours, as described in the special series paper by Leao et al[5]. Although historically there has been concern over the reliability of the information obtained, a reported contemporary diagnostic yield of 80-94% has led to increased acceptance that a renal tumour biopsy should be offered to many patients presenting with SRMs in whom treatment is being considered[5]. Many urologists now accept that all patients being considered for active surveillance or an ablative treatment should have a renal biopsy.

As we now understand more about the natural history of SRMs, we know that they tend to grow slowly, with a reported average growth of approximately 0.31cm/year[6, 7]. Given only 1-2% of patients on active surveillance develop metastatic disease during follow up, surveillance with repeat interval imaging is a good initial option for some patients with T1a disease, particularly those who do not want surgical treatment or who are unfit for it. As described by the special series paper by Volpe[6], delayed intervention can be offered to those whose masses have shown rapid growth. However, nephron-sparing surgical treatment

with partial nephrectomy remains the standard of care for younger and fitter patients with SRMs and those with masses > 4cm. Excellent 10-year survival rates of over 95% have been shown with laparoscopic partial nephrectomy (LPN) for cT1a disease[8]. With comparable oncological outcomes to radical nephrectomy but improved renal function outcomes, partial nephrectomy has replaced radical nephrectomy as standard of care for uncomplicated SRMs where surgery is required. Developments to improve the cosmesis and morbidity associated with LPN have also been attempted and are described in the special series paper by Kim et al [9]. They include laparoendoscopic single-site surgery (LESS) and natural orifice transluminal endoscopic surgery (NOTES). Both techniques are challenging and further evidence is required to consolidate their role in routine laparoscopic partial nephrectomy.

In the past decade, robotic assisted laparoscopic partial nephrectomy (RALPN) has increased in popularity and it is likely to overtake LPN and open partial nephrectomy (OPN) as the most common method for partial nephrectomy in regions where the robot is accessible, despite the significant costs associated with robotic surgery. The key advantages appear to be a shorter learning curve and reduced warm ischaemic time, whilst the peri-operative and short-term outcomes of RALPN appear to be at least as good as LPN[10]. The short-term recovery and time taken to discharge home is quicker with LPN and RALPN compared to OPN. The long-term oncological outcomes of RALPN are still awaited, though early markers of surgical success such as positive margin rates are encouraging in experienced hands. Zhao et al[11] and Novara et al[10], in their special series papers, describe the techniques, key considerations and outcomes for LPN and RALPN respectively.

OPN is still the preferred surgical modality in patients in whom LPN or RALPN approach would be difficult, for example, re-do partial nephrectomies, complex tumours (large or endophytic) and in those with multiple renal tumours (e.g. hereditary renal tumours). It also allows ice cooling of the kidney in patients with impaired renal function. The indications, technique and considerations are detailed in the special series paper by Anastasiadis et al[12].

The increasing role of ablative treatments for SRMs, such as radiofrequency ablation (RFA) and cryotherapy are covered in this special series by Kelly et al[13] and Zondervan et al[14], respectively. Currently their use is indicated primarily in high co-morbidity and elderly patients not suitable for surgical treatment. Short-term morbidity profiles of percutaneous techniques are better than LPN, though long-term oncological outcomes are lacking. Medium term outcomes for cryotherapy have shown slightly higher local progression rates than LPN[14]. However, as with all ablative treatments for cancer surgery, as the technique is developed and optimised, it is important to collect long-term data on oncological outcomes. If favourable, ablative treatments would lend themselves to a more prominent role in patients with SRMs.

To round off the special series, Raison et al[15] cover particularly challenging and unusual situations in partial nephrectomy that a urologist may encounter

and Caputo et al[16] discuss how to deal with the complications arising from the procedure.

The future is likely to see the widespread establishment of RALPN and technologies associated with this. The increase in the number of robots in the past 10 years[17] defies conventional health economic arguments, which suggest the robot is here to stay. Cheaper platforms, which are more affordable, are imminent and eagerly awaited. As described by Malthouse et al[18], developments in RALPN are likely to take place in integrating imaging and navigation with augmented reality and inclusion of haptic and sensory capabilities.

The management of the small renal mass present unique challenges to the modern urologist. From making an accurate diagnosis to selecting the appropriate treatment for each patient, this special edition provides a comprehensive guide from leading experts on all aspects of this often complex and multi-factorial clinical condition.

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